NESTABLE CATCH BASIN ASSEMBLY WITH REMOVABLE DEBRIS TRAP

CROSS REFERENCE TO RELATED APPLICATIONS

Not Applicable

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

BACKGROUND OF THE INVENTION

[0001] This invention relates to catch basins for drainage systems used, for example, to drain rainwater from a field. In particular, it relates to a catch basin assembly, including a basin portion and a removable debris trap, that is configured so that a plurality of the basin portions can be stacked or nested for space-efficient storage and transportation.

[0002] Drainage systems are typically used to drain excess surface water (from rain or watering devices) from an area of land, such as an athletic field or a golf course, or from a landscaped or hardscaped area. Such systems typically include a network of underground conduits or pipes leading to a storm sewer, reservoir, receptacle, or pond ("buried pipe" systems). Surface water or run-off is collected in a plurality of drain assemblies, each of which comprises a catch basin or receptacle that is connected to the underground conduit network by a vertical pipe or riser.

[0003] In prior art drainage systems, a grate covering each catch basin or receptacle prevents some of the larger items of debris carried in the run-off or surface water from entering the drainage system, where such larger items of debris can cause clogs or stoppage. Nevertheless, smaller debris particles, such as sand and silt, can still enter the system and block fluid flow to a degree sufficient to cause water to back up through the drain assemblies.

[0004] Another drawback to prior drainage systems is that, due to variations in the terrain, the depth of the drainage conduits below the surface may vary from place to place within the system. Therefore, the catch basins or receptacles may require housing extensions of various dimensions to connect to the conduit system.

[0005] Finally, in prior art drainage systems, the catch basins or receptacles are not nestable or stackable, thereby taking up much unnecessary space in storage and in transit.

[0006] Accordingly, it would be advantageous to provide a catch basin assembly that can be used with typical buried pipe drainage system, wherein the catch basin assembly has an improved ability to keep particulate debris out of the underground conduits, and wherein the catch basin assembly easily adapts to varying depths of the underground conduits. Moreover, it would be advantageous to make such an assembly with components that are nestable or stackable for ease of storage and transport.

SUMMARY OF THE INVENTION

[0007] Broadly, the present invention is a catch basin assembly for a drainage system having a buried drainage conduit, the catch basin assembly comprising a housing having an open top and an outlet at the bottom adapted for connection to the buried drainage conduit; and a debris trap removably mounted in housing, wherein the debris trap retains particulate matter entering the housing with water flowing into the top of the housing, while allowing water from which the debris has been removed to flow through to the outlet. More specifically, in a preferred embodiment, the debris trap comprises a bowl for retaining the debris; a retention rim or lip that surrounds the top of the bowl, and that engages an internal shoulder within the housing; and a circumferential array of apertures below the rim, whereby, when the level of water in the bowl reaches the array of apertures, the water flows out of the bowl and through to the outlet. When the bowl of the debris trap is filled with debris (or at predetermined time intervals), the debris trap is simply removed and replaced with a clean unit. A preferred embodiment of the invention also includes a cover with a grate section removably installed in the top of the housing.

[0008] Also, in the preferred embodiment, the outlet is configured for attachment to the upper end (inlet end) of a vertical pipe or riser, the lower (outlet) end of which is fluidly coupled to the buried drainage conduit. Thus, a single housing size can be used throughout a drainage system, with risers of different length allowing the accommodation of different depths of the drainage conduit at different locations. Furthermore, in the preferred embodiment, the housing has a tapered shape, whereby a plurality of housings (with the grates and debris traps removed) can be

nestably stacked for space-efficient storage and transport. Likewise, it is advantageous to configure the debris trap for nestable stacking.

[0009] As will be more fully appreciated from the detailed description set forth below, the present invention provides improved capture and retention of particulate debris as compared with prior art devices. Furthermore, the housings and (optionally) the debris traps can be nested for efficient storage and transportation. Finally, the housing can be connected to underground conduits of different depths merely be selecting risers of the appropriate length.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1 is a perspective view, partially in section, of a catch basin assembly, in accordance with a preferred embodiment of the present invention, as connected to a buried drainage conduit by a riser;

[0011] Figure 2 is a perspective view of the removable debris trap used in the catch basin assembly of Figure 1;

[0012] Figure 3 is a bottom perspective view, partially in section, of the catch basin assembly of Figure 1;

[0013] Figure 4 is an axial cross-sectional view of the catch basin assembly of Figure 1;

[0014] Figure 5 is an axial cross-sectional view of a plurality of catch basin housings, of the type used in the catch basin assembly of Figure 1, wherein the housings are stacked in a nested stack; and

[0015] Figure 6 is an axial cross-sectional view of a plurality of debris traps, of the type used in the catch basin assembly of Figure 1, wherein the debris traps are stacked in a nested stack.

DETAILED DESCRIPTION OF THE INVENTION

[0016] Turning first to Figures 1 through 4, a catch basin assembly 10, in accordance with a preferred embodiment of the present invention, is shown connected to a pair of conduits 12a, 12b by a vertical pipe or riser 14 and an inverted "T" fitting 16. The conduits 12a, 12b are of the type typically employed in a buried pipe drainage system. They are fluidly coupled to each other and to the riser 14 by the "T" fitting 16 by any conventional means well-known in the art. For example, the upstream conduit 12a is inserted into one horizontal leg of the "T" fitting 16, the downstream conduit 12b is inserted into the other horizontal leg of the "T" fitting, and the riser 14 is inserted into the upright (vertical) leg of the "T" fitting. The conduits 12a, 12 and the riser 14 may be secured to the "T" fitting 16 by any suitable means. For example, if these components are made of PVC tubing, they may be secured by any suitable adhesive.

[0017] The catch basin assembly itself comprises a receptacle or housing 18, a debris trap 20, an outlet portion 22, and a grated cover 24. The housing 18 may be of any suitable shape that can be configured to be stacked in a nesting relationship (as will be described below). In the exemplary embodiment shown, the housing 18 is in the form of a pair of inverted, truncated, right frusticones conjoined end-end-to-end (i.e., axially). Thus, the housing 18 has a circular cross section and an outside diameter that decreases in the axially downward direction so that the housing 18 tapers radially inward from top to bottom. The quality of nestability can be obtained with a housing having a rectangular (particularly, a square) cross section, wherein the perimeter decreases from the top of the housing to its bottom to provide the inward taper. Other housing configurations may also be suitable for this purpose.

[0018] The outlet portion 22 is formed integrally with, and extends downwardly from, the bottom of the housing 18. The outlet portion 22 is tubular, and it has a bifurcated wall that defines an annular slot 26 (see Figures 3 and 4) that is dimensioned to receive the upper end of the riser 14 for connecting the housing 18 to the riser 14 in a fluidly-coupled relationship, as shown in Figure1.

[0019] The upper end of the housing 18 defines a large inlet opening in which the cover 24 is advantageously installed. The cover 24 typically includes an apertured grate 28, a first annular

lip 30 surrounding the grate 28, and a tubular portion 32 depending downward from the grate 28. The diameter of the lip 30 is approximately equal to the diameter of the open upper end of the housing 18, so that the lip 30 seats on the open upper end of the housing 18, as shown in Figures 1, 3, and 4. The tubular portion 32 fits inside the top of the housing 18 with a friction fit, and is unsecured, so that it is removable. In the exemplary embodiment shown, the cover 24 is substantially circular in cross section to conform to the circular cross section of the housing 18. If the housing were to be square, for example, the cover would likewise be square.

[0020] As mentioned above, in the exemplary embodiment shown, the housing 18 is formed of two axially-conjoined, inverted, truncated right frusticones. In this configuration, the exterior of the housing 18 includes a radially inward-directed annular step 34 around its perimeter, approximately at its mid-section. The annular step 34 corresponds to an annular shoulder 36 around the interior wall of the housing 18. The shoulder 36 supports the debris trap 20, as explained below.

[0021] The debris trap 20, as best shown in Figure 2, comprises a bowl or pan 38 having an exterior surface that tapers radially inward in the axially downward direction. Integral with the top of the bowl 38 is an annular flow-through section 40 defining a circumferential array of apertures 42 separated by ribs 44. The flow-through section 40 is topped by a second annular lip 46, the diameter of which is approximately equal to the diameter of the annular shoulder 36 in the housing 18, so that when the debris trap 20 is installed in the housing 18, the second annular lip 46 seats on the shoulder 36. Thus, when the cover 24 is removed, the debris trap 20 can be removably installed in the housing 18, and then removed when full of debris, or whenever it is desirable to do so.

[0022] Referring again to Figure 1, with the catch basin assembly 10 connected to the conduits 12a, 12b of the drainage system by means of the riser 14, water enters housing 18 through the grate 28 in the cover 24. The grate 28 blocks the entry of larger objects. The water then flows down into the bowl 38 of the debris trap 20, which captures and retains smaller debris particles, such as sand and silt, which settle out into the bowl 38. When the water in the debris trap 20 reaches the level of the flow-through section 40, it flows out of the apertures 42 down into the

bottom portion of the housing 18 and through the outlet portion 22 into the riser 14, and then into "T" fitting 16, from which it enters the buried conduits 12a and/or 12b. Whenever it is desired to remove the debris trap 20, the cover 24 is removed, and the trap 20 is lifted out. The trap 20 can then be emptied of debris and replaced, or a new trap 20 can be installed.

[0023] Figure 5 shows how the external configuration of the housing, as described above, allows a plurality of housings 18 to be stacked in a nesting relationship to save space during storage and transit. Likewise, Figure 6 illustrates a plurality of debris traps 20 stacked in a nesting relationship, as allowed by the external configuration described above.

[0024] While a preferred embodiment of the invention has been described above and is illustrated in the accompanying drawings, it will be appreciated that this embodiment is exemplary only. Thus, a number of variations and modifications may suggest themselves to those skilled in the pertinent arts. For example, the housing and the debris trap may be any convenient shape other than circular in cross section, and the debris trap may be removably retained or held in the housing by any suitable mechanism. Moreover, the debris trap 20 described and shown in the accompanying drawings is merely one example of various functionally equivalent debris trapping means that would suggest themselves to those skilled in the pertinent arts. These and other modifications and variations are considered to be within the spirit and scope of the invention, as defined by the claims that follow.